REMARKS

Claims 1-6 are pending.

Claim 3 has been objected to but would be allowable if rewritten in independent form.

Claims 1-6 stand rejected under 35 USC §103(a) as being allegedly unpatentable over Chean in view of Khotimsky.

Changes in the Claims:

Claims 4 and 5 have been amended in this application to further particularly point out and distinctly claim subject matter regarded as the invention. No new matter has been added.

Rejection under 35 USC §103(a) – claims 1-6

Claims 1-6 stand rejected under 35 USC §103(a) as being allegedly unpatentable over Chean in view of Khotimsky. This rejection is respectfully traversed.

Under MPEP §706.02(j), in order to establish a prima facie case of obviousness required for a §103 rejection, three basic criteria must be met: (1) there must be some suggestion or motivation either in the references or knowledge generally available to modify the reference or combine reference teachings (MPEP §2143.01), (2) a reasonable expectation of success (MPEP §2143.02), and (3) the prior art must teach or suggest all the claim limitations (MPEP §2143.03). See In re Royka, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974).

Claim 1

Chean discloses many Fault-Tolerant Process Arrays (FTPA) reconfiguration techniques. In particular, Chean describes "fault stealing" strategies and "complex fault stealing". However, these techniques **do not separate positioning** of functional elements and their routing. In the Direct Reconfiguration (DR) algorithms, positioning and routing **cannot** be separated. As described on page 62 of Chean, a faulty cell is replaced by another faulty cell, with all its connections. So a functional element (faulty cell), which is chain-shifted, is shifted while keeping its original connections. So a functional element, which has been chain-shifted, is then linked with functional elements which are not its neighbors in the physical array. Thus the functional element is not linked with these elements by the shortest tracks (see for example on Figure 9 elements (4,3),(3,3),(2,3) in applying the Direct Reconfiguration Scheme, and on Figure 10 elements (2, 2) and (2, 3) in applying the Complex Fault Stealing scheme). Figures 9 and 10 show "both physical and logical coordinates" (see page 62 lines 40-41). As defined in page 63 lines 44 - 46 for the Complex Fault Stealing scheme, "the interconnect links required by the algorithm become **more complex** than that required by Direct Reconfiguration (DR)". The DR limit is that said reconfiguration fails when there are more than one horizontal fault in a line.

Khotimsky describes an algorithm for the shortest routing path between any two network nodes. As defined in page 10 lines 20-26, and in page 16 lines 26-28 of the present specification, the routing step may be realized by using methods known by those skilled in the art.

Applicant requests reconsideration of claims 1-6 rejection because there is no justification in Chean or Khotimsky which suggests that both references be combined in the manner proposed.

As defined in page 9, lines 22-24 of the present specification: "the reconfiguration method of the invention is based on a **positioning** technique **not correlated with routing**". As defined in page 10 lines 21-23, "Routing is performed by a shortest track search algorithm". After having been positioned, functional elements are necessarily linked to their nearest neighbors (see from page 16 fine 26 to page 17 line 5).

It is the separation between the positioning step and the routing step which allows an optimization of the routing (see page 7 lines 4-9: "...the organization of the interconnecting elements is not imposed by the method...").

Contrarily to prior art techniques, a structure placed in using our method is **not** necessarily routable (see from page 17 line 11 to page 18 line 5, there is the possibility of "a routing impossible" (page 18 line 4)). In such case, the method is recursive: positioning / routing / positioning / routing... Therefore, the presently claimed method is novel over the prior methods (see page 7 lines 4-9).

For the above reasons, it is not obvious for one skilled in the art to apply a routing algorithm (such as the one disclosed in Khotimski for example) to an array reconfigured

by a method described by Chean, because the routing algorithms may be applied only to **a physical array**, and **not to both a logical and physical array** as disclosed in Chean.

Claim 2

Claim 2 describes the positioning step, which corresponds to criterion 1 and criterion 2 on pages 11 and 12. Claim 2 considers distances (distance 1, distance 2 ...), but does not consider direction and way. In claim 2, the elements are positioned in increasing, as and when required. a neighboring circle around the faulty element. This circle may be increased far more than position (i + 1, j + 1) and for example to i-1 (see figure 4 "decrement i"). When an element (i +1, j + 1) does not exist, the prior art algorithm does not function, when such an increasing does still function (if a positioning at distance 1 is not possible, we may try at distance 2 ... this may correspond to decrement i or j).

In claim 2, "if S+1 positions have been tested without success, we return to the previous functional element in the positioning sequence and proceed with the next position for this functional element".

In Chean, the arrays in which the direct reconfiguration is applied, have a two-dimension structure: rows + columns. In the algorithms, each column is scanned from bottom to top, the faulty elements being shifted either right or down. The Complex Fault stealing, which is the nearest technique, uses positions (i + 1, j) and (i, j + 1). The Direct Reconfiguration techniques are scanned vertically or horizontally, in following a

provided direction (see page 62 "by scanning each column upward..., the fixed stealing algorithm scans all rows in the order of increasing index numbers....").

Chean describes only scanning methods in a direction in which indices i and j are increasing. So the positioning step as presently claimed is more secure (all supplementary elements may be used, whatever positions of faulty elements and positions of supplementary elements are). The algorithm as claimed in claim 2 functions as much as S+1 (S=supplementary elements number) is superior to faulty functional elements number, and stops when S+1 is insufficient. The limits of prior art techniques are different (see Chean figure 14 page 64) : the DR algorithms fail when there are more than two faulty elements in a row (even if many supplementary elements are not used).

In contrast to Chean, the process of the presently claimed invention may be used for bi-dimensional structures, and for hypercube (positioning criterion is based on distance between functional elements). In Chean, the DR algorithms (fixed stealing or complex-stealing algorithms) use supplementary row and column (see Chean page 62 lines 21-22: "it uses one row and one column of spares R=C=1"). Whereas in the presently claimed invention, there is no presumption concerning the number S (see figures 2B and 3) and the supplementary elements positions. So in the presently claimed invention, contrarily to Chean, the supplementary elements number and the supplementary connections number may be chosen and precisely adapted, without the need to over-dimension the array with a supplementary row and with a supplementary column.

Claim 5

Claim 5 defines a positioning of blocks functional elements (see from page 15 line 13 to page 16 line 3). Such an alternative allows to reduce positioning time. Chean defines the terms of "array", of "cell", of "block" (see in page 58 third paragraph: "A group of cells in a row, a column, or block in called a set": a block is **not** an element). Chean in pages 62, 63 describes only replacement of cells in rows or columns, but **not** replacement of blocks.

Applicant therefore submits that the rejection based the Chean and Khotimsky reference is improper and should be withdrawn. Thus, Applicant submits that claims 1-6 recite novel subject matter which distinguishes over any possible combination of Chean and Khotimsky.

Rejection of claims 2-6

Claims 2-6 stand rejected under 35 U.S.C. §103. These rejections are respectfully traversed for at least the reason that each of the rejected claims ultimately depend on an above-discussed base claim. The arguments set forth above regarding the base claims are equally applicable here. The base claims being allowable, the dependent claims must also be allowable.

Conclusion

For all of the above reasons, applicants submit that the amended claims are now in proper form, and that the amended claims all define patentable subject matter over the prior art. Therefore, Applicants submit that this application is now in condition for allowance.

Request for allowance

It is believed that this Amendment places the above-identified patent application into condition for allowance. Early favorable consideration of this Amendment is earnestly solicited. If, in the opinion of the Examiner, an interview would expedite the prosecution of this application, the Examiner is invited to call the undersigned attorney at the number indicated below.

The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 50-1698.

Respectfully submitted,
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